QUAIL MANAGEMENT PLAN

FOR

THE CEDARS PLANTATION

AVALON, MISSOURI

BY
JEFF CHURAN
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PREFACE

Although I have been committed to this project for several months, I have only recently decided to document it in written form. Why?

First, committing the plan to writing forces me to be specific in defining and quantifying goals, objectives and action plans. The plan will become the basis from which success can be measured.

Second, I will be calling on others to critique the plan; also family members and hunting buddies to help carry it out. The written plan will clearly communicate my intentions.

Finally, if the project is successful the written plan might be helpful to others who want to improve quail numbers on their properties.

INTRODUCTION

In February (1998) I visited and hunted at two of Tommy Williams' fabulous properties near Thomasville, GA - Talokas Plantation and Mill Creek Plantation. Having been there ten years ago, I was very impressed with the results of intensive habitat management at Talokas over that interval.

In 1988 we hunted Mill Creek on the first day. We moved 30 coveys and killed 30 birds. That was – and still is – my most memorable quail day. On the second day we shot Talokas. We had contact with approximately ten coveys and harvested less than a dozen birds.

The Williams' at that time had recently acquired Mill Creek that had been managed by the previous owners strictly for wild birds. Talokas had been in family ownership for some time and they were transitioning away from preseason stockings of pen-raised birds towards a total wild population.

This year we shot Talokas on Monday. We moved approximately 25 coveys and harvested 20 birds – the "Wagon Limit." On Tuesday, we hunted Mill Creek. We moved 23 coveys and shot 19 quail - two great days afield.

I was tremendously impressed with the results of the intensive habitat management at Talokas over the past ten years. On the airplane ride home I began to think about doing something similar, although on a much smaller scale, at our "Kissick Farm."

HISTORY

Janet and I purchased a 320-acre farm south of Avalon, MO from Mrs. Ralph Kissick in 1991 (Exhibit 1). Mr. Kissick had passed away a few years earlier and the children encouraged Lavone to sell the farm and move to town.

The Kissicks had owned the farm for nearly 50 years, having purchased it from the Baymiller family in the 1940's. The Baymillers had come from Illinois in 1902 to establish the farm. It was known as "The Cedars", presumably after the shelterbelt of huge cedar trees north and west of the house. I would like to re-establish the name "The Cedars," or perhaps "The Cedars Plantation."

Ralph Kissick cared for the farm well, employing soil conservation practices (terraces, waterways, dry structures, crop rotations, etc.) before they were popular or required. In 1988 he enrolled the northeast 80-acre field No. 1 (73.9A) in the Conservation Reserve Program (CRP) at $65.00/acre.

At my request, and as a condition of the purchase, Mrs. Kissick enrolled the balance of the erodible land (127.6A) in the CRP in 1991, at $64.50/acre. We closed the real estate transaction upon acceptance of this acreage into the program.

After Mr. Kissick's retirement, Ronnie Bowes did the farming on a sharecrop (1/2 – 1/2) basis. The net income was less than $40 per acre. Neighbor Bob Plummer helped me recruit his tenant, Dennis Watson, in 1994 to farm the tillable acres remaining on a cash rent basis. The cash rent was (and still is) ten bushels of soybeans per acre.

RATIONALE

I originally purchased the Kissick Farm for two reasons; investment diversification and quail hunting. On both fronts the purchase has been successful. Economically the income from crops, CRP and house rent is more than paying the mortgage. Farm property values are escalating as well. As for quail hunting, the property has afforded three or four nice hunts per year.

My February trip to Georgia triggered interest in intensive quail management. Several factors combine to make now an ideal time to begin. First, the original entry into the CRP comes out after 1997; second, development at "The Bottoms" - our 1000 acre bottom land farm/duck hunting area - is nearly complete; and third, youngest son John and family now live on the farm. His expertise and ability will be indispensable in carrying out this plan.

Some habitat decisions made in favor of quail may adversely affect deer and wild turkey. Since "The Bottoms" and our home place - "The Mountain" - have an abundance of each, I am comfortable with this.

Finally, I have nearly recovered from the 1993 flood, and can now afford to devote resources to this project.

The time is right!

THE OBJECTIVE

If pressed for a Mission Statement, it would be:

To attain maximum Bobwhite Quail density on the farm through intensive habitat management in combination with viable agricultural practices resulting in enjoyable hunting opportunities providing an annual harvest of birds consistent with a sustained population.

Many quail managers initially touted the Conservation Reserve Program as, "The best thing to happen for quail since the soil bank." My personal observation is that converting large crop fields to permanent grasses initially improved nesting, brood rearing and roosting habitat, but did little to improve the diversity of the farm. Large row crop areas were exchanged for monocultures of grass. As the grass fields have matured, perennial grasses (both native warm season and introduced cool season) have taken over, reducing the proportion of legumes and broadleaf plants to the detriment of quail. Bare ground has been replaced by litter - even thatch - reducing usefulness to quail, except perhaps for nesting cover.

With our CRP fields ranging in age from 7 to 10 years old, it is my opinion that the current quail density is not greater than in the pre-CRP years.

In preparing to develop and implement this quail management plan I have read several books, countless pamphlets and numerous research papers. While I have found differences in opinions in certain areas, everyone agrees that quail need and utilize diverse habitats and frequently occupy the transition zones of "edge" between vegetation types. Furthermore, quail do not move great distances; so the closer the different habitats are to each other, the better.

I believe that as the original ten-year CRP terms expire, we have an opportunity to increase both agricultural productivity and habitat diversity on the farm at the same time. The most logical approach is to reclaim the areas within the larger CRP fields – those portions having best topography (Exhibit 4) and the best soils (Exhibit 5) - for agricultural production, and offer the remainder for re-enrollment in the CRP. With maximum diversity in mind, I have chosen an initial goal of reclaiming 50% for cropland, however should soils or topography indicate otherwise, the agricultural proportion would be reduced accordingly.

POPULATION GOALS AND STRATEGIES

The Wildlife Habitat Appraisal Guide (WHAG) used by Missouri Department of Conservation (MDC) wildlife biologists to access habitat quality suggests that excellent habitat should support up to one Bobwhite per two acres. Conservation Area managers agree this is their target.

Literature reports densities of 1 to 4 birds per acre on intensively managed quail plantations in South Georgia and North Florida and on leases in South Texas and Southwestern Oklahoma. I questioned MDC's quail research biologist, Tom Dailey, about the possibility of achieving a density of one bird per acre on intensively managed habitat in Missouri. He believes it can be done, so I have established that as the initial goal for the project. Tom suggested assuming a covey size of 10 birds for planning purposes - if for no other reason, it makes the math easy.

Theoretically each covey will occupy ten acres. Analyzing the dimensions and somewhat irregular shape of the 320-acre farm (Exhibit 2) suggests including 20 acres belonging to Bob Plummer on the northwest and 20 acres on the southeast owned by Rusty Dennis in the management area. This creates a square 360 acre tract (Exhibit 3), ¾ mile by ¾ mile which, for planning purposes can be divided into thirty-six 10-acre habitat blocks – "Covey Headquarters" – each 660' x 660'. The area can also be conveniently divided into three 120-acre hunting courses (Exhibit 7).

We hunted portions of the farm four times in 1997. We moved seven different coveys and harvested 22 birds. I estimate that at least four coveys occupied areas of the farm that were not hunted. Therefore the population at the beginning of the project will be considered to be 11 coveys or 110 birds.

In order to reach the objective of 36 coveys or 360 birds in five years, the population must grow at a 26% rate compounded annually.

On a linear basis, covey numbers must grow at the rate of five coveys per year as follows:

Year	Coveys
1997	11
1998	16
1999	21
2000	26
2001	31
2002	36

On a geometric basis (most likely), coveys must increase as follows:

Year	Coveys
1997	11
1998	14
1999	18
2000	23
2001	29
2002	36

HARVEST GOALS AND STRATEGIES

The literature differs greatly in defining the sustainable harvest allowable as a percentage of the fall population. Estimates range from 20% to 70%. The most credible estimate for our latitude comes from Roseberry's research in Illinois - 55%.

Tall Timbers Research Institute recommends a 30% harvest rate, which I plan to adopt for our initial strategy. Tom Dailey's research at Blind Pony Conservation Area in North Central Missouri supports a higher sustainable harvest level of 50%. He told me that lower rates only serve to "feed the predators" after hunting season closes. Nonetheless, I will be conservative and plan to initially harvest at a 30% rate after the target population level is reached, hopefully in 2002.

In the meantime, during the years when we are "growing" the population, we will harvest at a 20% rate. Assuming non-hunting mortality rates remain the same, the population should grow at the required 26% rate. I realize that this violates the additive/compensatory mortality doctrine of the "annual surplus" harvest theory, but being an engineer I need to make the numbers work. The following table has been adapted from Tall Timbers Research Station and Quail Unlimited's "Changes in a Theoretical Quail Population Due to Hunting, Predation, and Reproduction":

	30% Harvest Rate Per Tall Timbers	Factor	20% Harvest Rate Interpolation
Fall Population	100		100
Hunting Harvest	30	30%/20%	20
Predation (Fall-Spring)	30	30%	30
Residual Birds	40		50
Predation (Breeding)	9	22.5%	11
Residual Birds	31		39
Chicks Born	160	5.16%	201
Subtotal	191		240
Chick Mortality	80	50%	100
Residual Birds	111		140
Predation (Until Fall)	11	10%	14
Next Fall Population	100		126
Percent Increase	0%		26%

Based on the 20% harvest rate and the geometric covey increase scenario, annual harvests during the development stage would be as follows:

Year	Harvest	Harvest/Per Course
1997	22	
1998	28	9 –10
1999	36	12
2000	46	15 – 16
2001	58	19 – 20

During this time hunting will be evenly distributed over the three courses. We will try to harvest only two birds per covey, so it is likely that each course will only be hunted one or two times a year until the year 2002.

In 2002 if the target population density is achieved, allowable harvest rate will be increased to 30%, providing for a harvest of 108 birds (.30 x 360). Assuming an average harvest of 12 birds per hunt, we could hunt each course three times (3 x 3 x 12 = 108). If the plan is successful, we will no doubt experiment with harvest rates above 30% later on.

Our Missouri quail season begins November 1 and ends January 15, lasting 76 days or nearly 11 weeks. During the establishment period, hunts should occur in late November and early December. After population goals are reached hunts could begin in mid-November and continue weekly until closure.

Even with the resources available to MDC, it is difficult and expensive for them to muster crews to transect areas determining absolute quail populations. Counts of birds or coveys moved during our initial hunts on each course will be our measure of population density. We will cover each course carefully and thoroughly with at least two bird dogs. Should we reach a course bag limit, we will continue covering it to gather population data.

Research projects using radio marked birds have shown that two-man, two-dog teams find only about 40% of the birds in an area. Four-person teams find approximately 50%. A factor of 2.5 at 40% or 2.0 at 50% can be applied to observed birds to estimate total population.

Assume that during the first hunt of the year on a course we count 48 birds. Applying the 2.5 factor we would estimate that the population is 120 birds or one bird per acre. On the strength of this estimate we would feel comfortable harvesting 30% or 36 birds from that course.
What if our population estimate was too high (no doubt due to the fact that our dogs are superior to the researchers')? Using Roseberry's allowable harvest rate of 55%, we would be within sustainable tolerance if the actual population were as low as 66 birds, or slightly more than .5 birds per acre - half our estimate. If the actual population was .75 birds per acre, we would be harvesting at a 40% rate.

THE LAND

The purpose of this section is to describe the topography, the soil types and the current land use on the farm.

The topography information was obtained from the USGS 7½' quadrangle map of the area. In this format, contours are shown at 4-meter intervals with a scale of 1: 24,000. Contours on the management area range from 252m (827 ft.) to 232m (761 ft.). Allowing for interpolation above and below these levels indicates an elevation difference of approximately 70 feet over the tract. The east half of the property is dominated by a continuous north-south ridge with gentle drainages leading off to the east and west. The west half of the area slopes to Bridge Creek, which transects the southwest corner flowing in a southeasterly direction. Slopes are steeper on the west side with more pronounced drainages and draws.

A copy of the topography map is included as Exhibit 4.

The soil type information was obtained from the new map of Livingston County. Soil types, not surprisingly, generally follow the topography. The following soils, listed in order of suitability for row crop production, are found on the farm:

84	Vesser Silt Loam	0% to 2% Slope
14B	Grundy Silt Loam	2% to 5% Slope
34B2	Lagonda Silty Clay Loam	2% to 5% Slope
34C2	Lagonda Silty Clay Loam	5% to 9% Slope
28C	Greenton Silty Clay Loam	5% to 9% Slope
28D2	Greenton Silty Clay Loam	9% to 14% Slope

A copy of the soil map is included as Exhibit 5.

The current (1997) land use is as follows:

Crop Fields		
5	23.9 A	Winter Wheat
6	17.5 A	Corn
7	6.0 A	Winter Wheat
P	14.4 A	Winter Wheat (Plummer)
	61.8 A	Total cropland
CRP Fields		
1	73.9 A	1998 CSG (75% Fescue/25% Timothy)
2	61.3 A	2001 CSG Mix (Orchard Grass, Lespedeza, Red Clover)
2a	5.4 A	2001 NWSG (Switchgrass)
3	9.9 A	2001 NWSG Mix (Big Bluestem, Little Bluestem, Indian Grass, Side Oats Gramma)
4	24.5 A	2001 NWSG Mix
6a	1.5 A	2006 Trees (Pin Oak)
7a	4.4 A	2001 NWSG Mix
8	6.2 A	2001 NWSG Mix
10	12.4 A	2001 NWSG Mix
17	2.0 A	2001 Trees (White Oak)
P	1.8 A	NWSG (Switchgrass) – Plummer
D	20.0 A	TALL Fescue – Dennis
	223.3 A	Total CRP
Pastures		
18	7.3 A	Fescue
19	11.5A	Fescue
	18.8 A	Total Pasture
Other	46.8 A	(Draws, Ponds, Woods, Hedgerows)
	5.5 A	(Homestead, Roadway)

A copy of the aerial photograph with the Farm Service Agency (FSA) field numbers is included as Exhibit 6.

HABITAT REQUIREMENTS

Based on my literature search, all agree that Northern Bobwhites require a diversity of habitats – daily and seasonally. The best habitat appears to be a mix of crop fields, grasslands and brush or woods. Furthermore all vegetative components need to be available within relatively short distances of each other.

Different structures are required for nesting, broodrearing, roosting, feeding, loafing and escape cover.

Grasslands are preferred for nesting, brood rearing and roosting, although the structural characteristics vary for each. MDC research on CRP fields has identified the composition preferred for each function (i.e. proportion of grass/broadleaf plants in the canopy, height of canopy, proportion of bare ground and litter, etc.).

For nesting cover Bobwhites prefer a medium height (10" to 15") full canopy stand composed of 75% grass and 25% broadleaf. Litter cover (70%) is required at nesting sites and bare ground is not as important. "Clumpy" grasses are best, such as Native Warm Season mixes or Orchard Grass/Timothy Cool Season mixes. This composition suggests a mature successional stage, three to four years after the planting.

For broodrearing a low, but full canopy of evenly mixed grasses and broadleafs is preferred (50% - 50%). Less litter (60%) and more bare ground (25%) are required than for nesting. This vegetative cover must attract numerous insects, which are the primary diet for Bobwhites during the late spring and summer months. A high component of legumes (particularly Red Clover) is ideal for insects. Broodrearing cover seems to be an intermediate successional stage typical of a two to three year-old stand.

Roosting cover can be a taller (12" to 36"), less dense mix of grasses (34%) and forbs/legumes (27%) typical of a recent planting, one to two years old. Some litter is acceptable, and bare ground is essential (23%).

For winter escape and loafing Bobwhites prefer dense, woody areas such as brushy draws, fencerows and thickets. This habitat type is essential throughout the year for summer shade, predator escape and winter weather protection.

Food source during fall, winter and early spring (pre-insect season) is principally seeds from annual plants such as pigweed, ragweed and foxtail. In agricultural areas crop residue from corn, milo and soybeans is also available and important.

HABITAT PLANNING

For planning purposes the farm has been divided into (36) ten-acre blocks – Covey Headquarters – each 660' square (Exhibit 7). During the planning process each block will be considered individually to make sure all required habitat types – food, grasses and dense woody cover – are interspersed.

A planning map of the farm has been created, by over-laying on an aerial photograph (1" = 400') the grid blocks, the topographical contours, the soil type boundaries and the field borders.

Each existing CRP field will be analyzed first for the best soil types – we expect this to occur on the best topography. Based on the diversity goal of returning 50% of the area to crops, a new field configuration will be designed. The new design will be checked with respect to habitat components available in each ten-acre grid block. If, for instance, a particular block becomes 100% crop, the boundaries will be modified to allow at least one acre of grass. If, for instance, a grid block is entirely in grass, a food plot will be added. Finally, each block will be checked for dense woody cover, which if not available naturally, will be added by shrub planting.

After the above described "office planning" is completed, the fields will be laid out on the ground and modified as necessary for field conditions (i.e. small drainages, machinery mobility, etc). When the fields have been staked and proposed boundaries mowed, the NRCS technicians and the farm operator will be invited to inspect them. They will be modified to reflect their suggestions.

When the farm design has been completed as above, a plan of operation will be developed. This plan will guide the rotation of crops and food plots as well as the successional management of grasses and woody cover.

Finally, when the farm design and plan of operation have been completed, a detailed action plan will be drafted. This five-year plan will precisely outline the steps and timing needed to execute the plan. In this process, each ten-acre grid block will be detailed on a large scale (1" = 100') drawing. Existing habitat features will be shown and the necessary improvements indicated.

Wildlife food will be provided by means of the following:

Insects
Annual weed seeds
Waste grain in crop fields
Strips of crops left standing
Food plots

Waste grain is pretty sparse these days with improved plant genetics and more efficient combines. We plan to supplement the feed available from existing crop fields by leaving strips of standing grain around the edges. The tenant farmer will be compensated either by means of MDC's LAWS program (if extended) or by an adjustment in the crop share arrangement.

Food plots will be planted in those grid blocks where crop fields do not occur. Plots will be ½ acre in size (66' x 330') with half (33') planted to corn and/or milo. The other half of the strip will be vigorously disked to promote annual weeds and insets. Strips will be alternated annually.

Grass will be managed in accordance with MDC recommendations to provide the structural diversity needed for Bobwhites. A suite of techniques, such as burning, disking, mowing, etc., will be designed to create the various successional stages. Some grid blocks will no doubt contain limited amounts of grass. In such cases, the grass available will be managed to provide roosting/loafing cover, which is required year-round. This assumes (hopes) that the birds will move farther to locate and use ideal nesting and brood rearing conditions.

Dense woody cover (escape/hard-core) appears to be a limiting factor. Existing hedgerows, brushy draws and woods will be manipulated for long term benefits using techniques such as thinning, transplanting, root plowing, etc. Additional woody cover will be added where needed by planting trees and shrubs in rows between cultivated fields, along draws and in "thickets." It will take several years for the new plantings to provide benefits, so for the near term brush piles will be constructed in strategic locations.

AGRICULTURE

An important component of this plan is to conduct a model farming operation. The previous owners of the property, the Kissicks, were ahead of the times in terms of sustainable agricultural practices. They constructed terraces and dry structures much before their benefits were well known and cost shares were available. They practiced crop rotation – even planting clover in certain fields every third or fourth year. After Mr. Kissick died, tenant farmers (working both for Mrs. Kissick and for us) drifted away from these exemplary practices. Fields have been planted to the edge, rows have been straightened, waterways have been obliterated and rotations have been short circuited or eliminated (beans, beans, beans).

I intend to reverse this trend on both the current crop fields and those that roll out of CRP.

The agricultural plan of operation will emphasize at least the following practices:

Appropriate field borders
Crop rotation
Frequent soil testing
No fall plowing
Reduced spring tillage
Root plowing along existing hedgerows
Conservative use of herbicides and pesticides

It is our intention to put the profits resulting from agriculture back into the farm as we implement this plan.

RECORD KEEPING

In order to measure the degree of success of this project, records must be kept. Most important will be an estimate of the Bobwhite population on November 1 each year (number of coveys/number of birds) and the harvest. This information will be recorded separately for each course.

As stated in the Harvest Strategy discussion, the annual population will be estimated from observations made during the hunts. Whistling cock counts will be conducted in May/June. Morning covey call (KOI – LEE OR HOY) counts will be conducted in October. It will be interesting to see if we find a correlation between these counts and the fall population estimate determined from the hunts.

A journal and/or log format will be designed to record the following for each hunt:

- Date
- Course Hunted
- Number of Hunters
- Hours Hunted
- Number of Coveys Flushed/Estimated Size
- Other Coveys Seen/Estimated Size
- Number of Birds Bagged (Male/Female – Juvenile/Adult)
- Number of Birds Crippled
- Coveys Locations

From data recorded on each hunt, the following statistics will be calculated for each course, each year:

- Number of Hunts
- Number of coveys
- Number of Birds
- Hours Hunted/Gun Hours
- Gun Hours per 100 Acres
- Coveys Flushed per Hour
- Birds Bagged per Hunt
- Birds Bagged per Course
- Harvest Percentage

Tom Dailey has suggested that we keep similar records of our hunts on a nearby “non-treated” farm in order to truly measure success.

LITERATURE

The following publications have been helpful during the planning process:

BOOKS

The Bob White Quail – Its Habits, Preservations, and Increase
Herbert L. Stoddard
Charles Scribner's Sons
1931

The Bobwhite Quail – Its Life and Management
Walter Rosene
Rutgers University Press
1969

Population Ecology of the Bobwhite
John L. Roseberry and Willard D. Klimstra
Southern Illinois Press
1984

Beef, Brush and Bobwhites
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Caesar Kleberg Wildlife Research Institute
Texas A&M University – Kingsville
1986

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1992

Plantation Management on a Share Cropper's Budget
David A. Avant III
L'Avant Studios
1994

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Loren W. Burger, Jr., Thomas V. Dailey, et al
1993

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Thomas V. Dailey
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MDC/SCS

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MDC/SCS

"Strategies for Enhancing Bobwhite Quail Populations in Missouri"
MDC
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MDC
1986

"Species Management Plan for the Bobwhite Quail in Missouri"
MDC
1987

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1997

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